Unusual nest sites of Réunion Stonechat *Saxicola tectes* high in trees—a response to increased predation risk of ground nests?

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Des nids du Traquet de la Réunion *Saxicola tectes* haut dans des arbres—une réponse à une augmentation du risque de prédation au sol? En décembre 2003, des Traquets de la Réunion *Saxicola tectes* ont été observés occupant des territoires dans la plupart des habitats à haute altitude dans le nord de l'île. Cinq nids ont été trouvés, dont deux juste au-dessus du sol sur des talus, deux à une hauteur d'environ 9 m et 12 m dans des arbres du genre *Cryptomeria*, et un à environ 7 m dans une fougère arborescente *Cyathea* sp. L'emplacement du nid à une hauteur élevée au-dessus du sol est inhabituel pour le Traquet de la Réunion, une espèce endémique commune de l'île de la Réunion, et le genre *Saxicola* en général. Des emplacements pareils sont-ils communs quoique restés inaperçus jusqu'à présent? Ou sont-ils dûs à l'absence locale de sites de nidification typiques, à un niveau localement élevée de dérangement, ou à une augmentation du risque de prédation des nids au sol par des mammifères prédateurs introduits? Cette dernière hypothèse semble être la plus plausible. Des études plus poussées sont toutefois nécessaires afin de déterminer si l'utilisation d'arbres comme site de nidification est un phénomène de plus en plus fréquent, ce qui pourrait avoir des implications pour la conservation.

Summary. In December 2003, territory-holding Réunion Stonechats *Saxicola tectes*, a common Réunion endemic, were encountered in most habitat types at higher elevations in the north of the island. Five nests were found, of which two were low above the ground on banks, whilst two were at *c.*9 m and *c.*12 m in *Cryptomeria* trees, and one at *c.*7 m in a tree fern *Cyathea* sp. Nest sites high above the ground are unusual for Réunion Stonechat and the genus *Saxicola* in general. Potential explanations include such sites being a more common but to date overlooked or unpublished trait of Réunion Stonechat, a local lack of typical nest sites, a locally high level of disturbance, or increased predation risk of ground nests by introduced mammalian predators. The latter explanation seems most likely. However, more detailed studies are required to investigate if tree nests are an increasingly frequent phenomenon with potential conservation implications.

Réunion Stonechat *Saxicola tectes* is endemic to the 2,500 km^2 island of Réunion, an overseas department of France in the Indian Ocean. The species is described as very common, typically at higher elevations of the island (e.g. Barré 1983, Barré *et al.* 1996), and currently is not considered globally threatened (BirdLife International 2009).

Although Réunion Stonechat is relatively conspicuous and easily observed, its breeding biology is not well known, and few detailed accounts of its nesting have been published (see Milon 1951 *in* Urquhart & Bowley 2002, Cheke 1987 and Probst 2002; a line drawing illustrates a typical nest in Barré *et al.* 1996). Here, I provide details on five nests found in December 2003.

Methods

During a visit to Réunion in December 2003, I located five nests of Réunion Stonechat (see Table 1 for details) and made unsystematic observations on the species' habitat and nesting.

Results and Discussion

Habitat

Along a hiking track from the village Le Brûlé towards the protected forest of La Roche Écrite (altitudinal range: *c.*700–1,500 m) in the north of Réunion, territory-holding Réunion Stonechats were encountered in most habitat types except dense, single-species plantations of introduced Japanese Cedar *Cryptomeria japonica* bereft of undergrowth. At lower altitudes with mostly exot-

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ic secondary growth, stonechat territories appeared clumped around openings and clearings. In the largely native, more open, mixed evergreen forest at higher altitudes, I found stonechat territories arranged linearly along the hiking track, with a territorial male every 100–300 m. However, I did not search for stonechats away from the trail.

Compared to other *Saxicola*, Réunion Stonechat occupies a broader range of habitats (Urquhart & Bowley 2002). According to Barré *et al.* (1996) and Cheke (1987), it can be found almost anywhere from the lower extent of the forest at 300–800 m up to the highest elevations at

*c.*3,000 m. Probst (2002) adds that in parts of the south it still occurs down to sea level and also mentions a nest at 3,050 m on the Piton des Neiges. Cheke (1987) notes that the stonechat is the only Turdidae on the island and therefore takes advantage of all the 'small thrush' niches open to it, i.e. open ground as well as closed-canopy forest, in addition to the scrub habitat typical of the genus *Saxicola*.

Nest sites

Table 1 gives details of the five nests found. Two were on banks (Fig. 3), whilst the other three were high above the ground: two at *c.*9 m and *c.*12 m, respectively, in *Cryptomeria* trees (Fig. 1), and one *c.*7 m high in a *Cyathea* tree fern (Fig. 2). The nest sites several metres above ground are unusual. Réunion Stonechats normally nest on the ground under a tussock or in a tuft of ground vegetation, or on vegetated banks along forest tracks (Milon 1951 *in* Urquhart & Bowley 2002, Barré *et al.* 1996, Cheke 1987, Probst 2002). Although Barré *et al.* (1996) mention that, occasionally, nests are located in trees, on the lower branches or in a trunk cavity 1–2 m above the ground, I have found no account of the species nesting higher up in trees.

Nest sites high above the ground are also unusual for the genus *Saxicola* in general, as its members typically nest on or near the ground in the cover of the field layer (Urquhart & Bowley 2002). There are several potential explanations for the high nest sites reported here. (1) Tree nests are a more common but to date overlooked trait of Réunion Stonechat. This explanation is unlikely, as the nesting of Réunion Stonechat has previously been studied systematically and in greater detail (Milon 1951 *in* Urquhart & Bowley 2002, Cheke 1987, Probst 2002), and available information on the birds of Réunion has been collected and compiled (Barré *et al.* 1996, Barré & Barau 1982), but not a single nest high in a tree has been reported. If it is a regular trait of the species, then it would most likely have been noted before.

(2) Local lack of typical nest sites. This is also unlikely, as in each of the three cases reported here potential typical nest sites were readily available both in the vicinity and in the wider surroundings of the nesting trees. At the picnic site these were in the form of areas with a well-developed field layer, such as patches of rough grass, vegetated banks and margins of roads and tracks, and root plates of fallen trees. Furthermore, the nest in a tree fern in native forest was located only *c.*200 m from a typical bank nest in the same habitat.

(3) Locally high levels of disturbance. Frequent and / or heavy disturbance may cause birds to nest high above the ground. However, the two nests on banks were located directly on the edge of a narrow, well-used hiking trail (during my observations several people passed the nest <2 m from the incubating female, without it leaving the nest) and a small road (with cars passing at a distance of <3 m), respectively. According to A. S. Cheke (pers. comm.), stonechats have successfully nested alongside the same trail for decades. Also, almost all of the Réunion Stonechats I encountered seemed relatively unwary of people, independent of whether they had an active nest or not.

(4) Predator avoidance / locally increased predation risk of ground nests. The most likely reason

Captions to photos on page 205

Figure 1. Nest site of Réunion Stonechat *Saxicola tectes* *c.*12 m above the ground in Japanese Cedar *Cryptomeria japonica* tree, Réunion, 17 December 2003. The arrow indicates the location of the nest (Markus Handschuh)

Site de nidification du Traquet de la Réunion *Saxicola tectes* dans un Cèdre japonais *Cryptomeria japonica* à environ 12 m au-dessus du sol, Réunion, 17 décembre 2003. La flèche indique l'emplacement du nid (Markus Handschuh)

Figure 2. Nest site of Réunion Stonechat *Saxicola tectes* *c.*7 m above the ground in tree fern *Cyathea*, Réunion, 17 December 2003. The arrow indicates the location of the nest (Markus Handschuh)

Site de nidification du Traquet de la Réunion *Saxicola tectes* dans une fougère arborescente *Cyathea* à environ 7 m au-dessus du sol, Réunion, 17 décembre 2003. La flèche indique l'emplacement du nid (Markus Handschuh)

Figure 3. Typical nest site of Réunion Stonechat *Saxicola tectes* on a vegetated bank, Réunion, 17 December 2003. The arrow indicates the location of the nest (Markus Handschuh)

Site de nidification typique du Traquet de la Réunion *Saxicola tectes* dans un talus herbeux, Réunion, 17 décembre 2003. La flèche indique l'emplacement du nid (Markus Handschuh)

Figure 4. Nest and eggs of Réunion Stonechat *Saxicola tectes*, Réunion, 17 December 2003 (Markus Handschuh)

Nid et œufs du Traquet de la Réunion *Saxicola tectes*, Réunion, 17 décembre 2003 (Markus Handschuh)

Table 1. Details of five nests of Réunion Stonechat *Saxicola tectes* found in December 2003.
[1 2 3] = For photograph of nest site see Figs. 1–3, respectively. [4] = For photograph of nest and eggs see Fig. 4.
* = Age estimated, based on nestling development of European Stonechat *S. torquatus rubicola* (pers. obs.).

Tableau 1. Données sur cinq nids du Traquet de la Réunion *Saxicola tectes* trouvés en décembre 2003.
[1 2 3] = Pour une photo de l'emplacement du nid, voir Figs. 1–3, respectivement.
[4] = Pour une photo du nid et des œufs, voir Fig. 4.
* = Estimation de l'âge basée sur le développement des jeunes du Tarier pâtre *S. torquatus rubicola* (obs. pers.).

Nest no	**1**[1]	**2**	**3**[2]	**4**[3,4]	**5**
Date	17 December 2003	17 December 2003	17 December 2003	17 December 2003	18 December 2003
Location and height a. s. l.	North Réunion, Mamode Camp, c.1,200 m	As nest 1	North Réunion, along hiking track to La Roche Ecrite, c.1,500 m	c.200 m from nest 3 along track, c.1,500 m	North Réunion near village Hell-Bourg, c.1,400 m
Habitat	Relatively flat, park-like, public picnic site, with single Japanese Cedar *Cryptomeria japonica* trees and various artificial vertical structures, surrounded by open Japanese Cedar plantation with grassy undergrowth	As nest 1	Steep terrain, mesothermic evergreen forest with dense undergrowth, short vegetation and bare soil	As nest 3	River valley with mostly steep topography and woods of exotic pine *Pinus* sp. and broadleaved trees
Nest site	c.12 m above ground in >20-m tall Japanese Cedar tree next to minor paved road; nest concealed in broom of dense short branches at trunk, dark spot and some nesting material visible from ground	c.9 m above ground in c.20-m tall Japanese Cedar tree; nest entirely concealed at base of first, dense, 1-m long branch, invisible from ground	Below track, c.7 m above ground in c.9-m tall live *Cyathea* tree fern, entirely concealed in cavity created by dead vegetation hanging from the trunk, invisible from outside	0.7 m above ground in semi-cavity on densely vegetated bank where the path had been cut from the slope; nest concealed by overhanging moss. Extent and shape of niche suggest that it may have been enlarged by the bird.	1.1 m above ground on vegetated rock face next to minor paved road; cavity behind clump of moss; nest entrance concealed by tuft of grass, only small hole visible from outside. Niche may have been enlarged by the bird.
Nest description	Outer walls mainly of dry grass and dry leaves, containing hardly any moss. Nest cup lined mainly with fine plant material and some animal hair and small feathers.	As nest 1	Not examined closely	Outer walls mainly of moss, resembling moss-dominated nests of European Robin *Erithacus rubecula*. Nest cup as nest 1.	As nest 4
Entrance faces	north-west	east	south-east	west	south
Nest contents *	Three nestlings c.9 days old	Two nestlings c.6 days old	Nest in construction	Presumably complete clutch of four eggs, female incubating	Presumably complete clutch of three eggs, female incubating

for high nest sites may be a (locally) increased predation risk of ground nests by introduced mammalian predators. Although the species is still common on Réunion (A. S. Cheke pers. comm.) and there is no published evidence that it suffers from high nest predation, which could cause birds to nest higher in trees, this may be a recent phenomenon that has not been noted in earlier studies (Milon 1951 *in* Urquhart & Bowley 2002, Cheke 1987, Probst 2002).

Both Black Rats *Rattus rattus* and Norway Rats *R. norvegicus* as well as feral Cats *Felis catus* have been introduced to Réunion (pers. obs.; Cheke & Hume 2008). The density of these potential nest predators is likely to be higher at locations frequented by humans (see Cheke & Hume 2008), such as the picnic site, e.g. due to waste and leftover food. However, because at least Black Rats have been abundant in the forests of Réunion at all elevations for centuries (see Cheke & Hume 2008), feral cats are a more likely cause of a significant change in nest site selection (A. S. Cheke pers. comm.).

Nest contents

I found clutch sizes of three (nest 4) and four (nest 5) eggs, and brood sizes of two (nest 2) and three (nest 1) nestlings. Both incubating females

were sitting tightly at around midday and were therefore presumed to have finished their clutches. Of 12 completed clutches that Milon (1951 *in* Urquhart & Bowley 2002) recorded, 11 comprised three eggs and one four eggs. In 1973–74, Cheke (1987) found eight nests containing three eggs and six with eggs, and assumed the clutch size to be 2–3 eggs. However, Barré & Barau (1982), Barré *et al.* (1996) and Probst (2002) report clutch sizes of 2–4 (most commonly three) eggs.

Conclusion

Nests of Réunion Stonechat high above the ground in trees merit further investigation to determine whether they are (a) a rare, irregular and local occurrence, or (b) more common and widespread but previously overlooked, or (c) a recent and perhaps increasingly frequent and widespread phenomenon. If the latter is the case, it should be established which factors cause tree nesting and, in particular, whether the phenomenon is related to predation of ground nests and therefore has potential implications for the conservation of this insular endemic passerine.

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References

Barré, N. & Barau, A. 1982. *Oiseaux de la Réunion*. St. Denis: Imprimerie Arts Graphiques Modernes.

Barré, N. 1983. Distribution et abondance des oiseaux terrestres de l'Ile de La Réunion (Océan Indien). *Rev. Ecol.* 37: 41–85.

Barré, N., Barau, A. & Jouanin, C. 1996. *Oiseaux de la Réunion*. Paris: Les Éditions du Pacifique.

BirdLife International. 2009. Species factsheet: *Saxicola tectes*. www.birdlife.org (accessed 4 July 2009).

Cheke, A. S. 1987. The ecology of the surviving native land-birds of Réunion. In Diamond, A. W. (ed.) *Studies in Mascarene Island Birds*. Cambridge, UK: Cambridge University Press.

Cheke, A. S. & Hume, J. P. 2008. *Lost Land of the Dodo: An Ecological History of Mauritius, Réunion and Rodrigues*. London, UK: A. & C. Black.

Probst, J.-M. 2002. *Faune indigène protegée de l'Ile de la Réunion*. Le Port: Association Nature et Patrimoine.

Urquhart, E. & Bowley, A. 2002. *Stonechats: A Guide to the Genus Saxicola*. London, UK: Christopher Helm.

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